Memorandum

To: *Diane Salkie, EPA Region 2*
Elizabeth Franklin, USACE

From: *Troy Gallagher, CDM Smith*

Date: *November 11, 2019*

Subject: *Summary of Oversight of Physical Water Column Monitoring*
September 18–20, 2019
Lower Passaic River Restoration Project

On behalf of the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE), Kansas City District, CDM Federal Programs Corporation (CDM Smith) traveled to the Lower Passaic River Study Area (LPRSA) on Wednesday, September 18 through Friday, September 20, 2019 and provided field technical oversight for the third round of surface water sampling associated with the Physical Water Column Monitoring (PWCM) program.

Sampling began on Wednesday, September 18 with the completion of the salt front sampling, followed by transect sampling at river miles (RMs) 8.4 and 10.2 on Thursday, September 19, and concluded with RM 12.0 and 13.5 on Friday, September 20. Oversight on all days was provided by Troy Gallagher of CDM Smith. Field activities were conducted by Ocean Surveys, Inc. (OSI) and AECOM on behalf of the Cooperating Parties Group (CPG). Anchor QEA provided field support on behalf of the CPG.

The fixed point monitoring locations are presented in Figure 1 from the CPG's quality assurance project plan (QAPP). Oversight was conducted in accordance with CDM Smith's Final QAPP for PWCM, dated August 13, 2019. Photographs of field activities are presented in Attachment 1. A copy of the field logbook notes is provided in Attachment 2. A copy of the sample tracking log is provided in Attachment 3.

Summary of Wednesday, September 18, 2019 Field Activities

Personnel in Attendance

Troy Gallagher – CDM Smith
James Roth – OSI
Alexandra Allen – OSI
Mike Tatarelli – AECOM
Clare Murphy-Hagan - AECOM
Chris Pelrah – Anchor QEA

All personnel met at the 1 Madison Street boat dock in Rutherford, New Jersey. OSI and AECOM rode in OSI's boat, which was equipped with equipment for sampling. Anchor QEA and CDM Smith were aboard a separate oversight boat.

The 2.2 ppt salt front was identified on Tuesday, September 17 during the chemical water column monitoring event (summarized in a separate summary report)_to give an idea of where the salt front would be today during sampling. The salt front was identified adjacent to channel buoy #12, south of the railroad bridge. After identifying the salt front, both boats mobilized upstream about 1.5 miles to begin sampling during the flood tide. In accordance with the QAPP, samples and vertical profiles of water quality parameters were collected every quarter mile beginning 1 mile above the salt front, and continuing to 2 miles downstream from the salt front. Samples were collected from the top and bottom of the river at all sampling locations.

After finishing sample collection at the final location 2 miles downstream from the salt front, both boats mobilized to the dock in Harrison, NJ adjacent to hand off coolers to Rick Purdy (AECOM). Both boats then waited here until the beginning of ebb tide sampling to minimize boat travel.

Once the ebb tide window opened, both boats mobilized to locate the 2.2 ppt salt front. The salt front was identified about 500 ft north of high power lines crossing over the river, adjacent to a crew boat launch on the East bank between RM 10.2 and 8.4. Sampling was conducted moving upstream during the ebb tide to ensure that the salt front would be caught during sampling. Samples were collected starting 2 miles downstream of the salt front from the top and bottom of the river and continued every quarter mile moving upstream. Vertical profiles of water quality parameters were collected at every sampling location. The final samples were collected 1 mile upstream from the salt front. No split samples were taken by CDM Smith during the salt front sampling event due to time constraints.

Both boats returned to the 1 Madison Street dock to conclude the sampling event for this day.

Summary of Thursday, September 19, 2019 Field Activities

Personnel in Attendance

Troy Gallagher – CDM Smith
James Roth – OSI
Alexandra Allen – OSI
Mike Tatarelli – AECOM
Clare Murphy-Hagan - AECOM
Chris Pelrah – Anchor QEA

All personnel met at the 1 Madison Street boat dock in Rutherford, New Jersey. OSI and AECOM rode in OSI's boat, which was equipped with equipment for sampling. Anchor QEA and CDM Smith were aboard a separate oversight boat.

All personnel mobilized to RM 8.4 to begin collecting the flood transect. Before beginning the collection of samples, Troy Gallagher boarded the OSI vessel to observe the collection of split samples. Facing upstream, seven locations were measured or measured and sampled from left to right. For the duration of the transect, flow data was obtained from a boat-mounted acoustic doppler current profiler (ADCP). Vertical water quality parameter profiles were collected from all seven positions using a YSI. Surface water samples were collected from positions 2, 4, and 6 at two depth intervals (surface and bottom), in accordance with the approved QAPP. For all sample locations, the bottom depth interval was sampled first, following a vertical YSI profile form surface to bottom. CDM Smith collected split samples from positions 2, 4, and 6, with the sample names 19E-CE02-T084-P2-BS-CDM (from the bottom sampling depth at location 2), 19E-CE02-T084-P4-AS-CDM (from the top sampling depth at location 4), and 19E-CE02-T084-P6-BS-CDM (from the bottom sampling depth at location 6). After all samples were collected, both boats mobilized to RM 10.2

Samples and YSI profiles were collected from RM 10.2 during the flood transect as described above. CDM Smith split samples were collected from positions 2 and 4 with the sample names 19E-CE02-T102-P2-BS-CDM (from the bottom sampling depth at location 2) and 19E-CE02-T102-P4-AS-CDM (from the top sampling depth at location 4). A duplicate split sample was collected from the top sampling depth at position 4, with the sample name 19E-CE02-T102-P4-AS-CDM-100. Both boats mobilized back to the 1 Madison Street dock and waited for the ebb tide window to begin. During the time between tides, Troy Gallagher packed all of the split samples collected into coolers and dropped them off at FedEx to be shipped to the laboratories. Two coolers were shipped to Katahdin Analytical Services with samples to be analyzed for total suspended solids, dissolved organic carbon, and particulate organic carbon.

Once the ebb tide began, the crew mobilized to RM 10.2 to begin transect sampling. Samples and YSI profiles were collected as described above. Following ebb tide sampling at RM 10.2, the crew mobilized to RM 8.4 where samples and YSI profiles were also collected across the transect at ebb tide. This

completed the sampling event for this day. Both boats mobilized back to the 1 Madison Street dock, and the boats were secured for the evening.

Summary of Friday, September 20, 2019 Field Activities

Personnel in Attendance

Troy Gallagher – CDM Smith
James Roth – OSI
Alexandra Allen – OSI
Mike Tatarelli – AECOM
Clare Murphy-Hagan - AECOM
Chris Pelrah – Anchor QEA

All personnel met at the 1 Madison Street boat dock in Rutherford, New Jersey. OSI and AECOM rode in OSI's boat, which was equipped with equipment for sampling. Anchor QEA and CDM Smith were aboard a separate oversight boat.

All personnel mobilized to RM 12.0 to begin collecting the flood transect. Facing upstream, seven locations were measured or measured and sampled from left to right. For the duration of the transect, flow data was obtained from a boat-mounted ADCP. Vertical YSI profiles were collected from all seven positions. Samples were collected from positions 2 and 4 at two depth intervals (surface and bottom), in accordance with the approved QAPP. At position 6, the depth was less than 6 feet, so only one sample was collected from a mid-depth position. For positions 2 and 4 locations, the bottom depth interval was sampled first, following a vertical YSI profile form surface to bottom. After all samples were collected, both boats mobilized to RM 13.5

Samples and YSI profiles were collected from RM 13.5 during the flood transect as described above. Both boats mobilized back to the 1 Madison Street dock and waited for the ebb tide window to begin.

Once the ebb tide began, the crew mobilized to RM 12.0 to begin transect sampling. Samples and YSI profiles were collected as described above. Following ebb tide sampling at RM 12.0, the crew mobilized to RM 13.5 where samples and YSI profiles were also collected across the transect at ebb tide. This completed the PWCM event sampling for this round. Both boats mobilized back to the 1 Madison Street dock for demobilization.

Figure 1

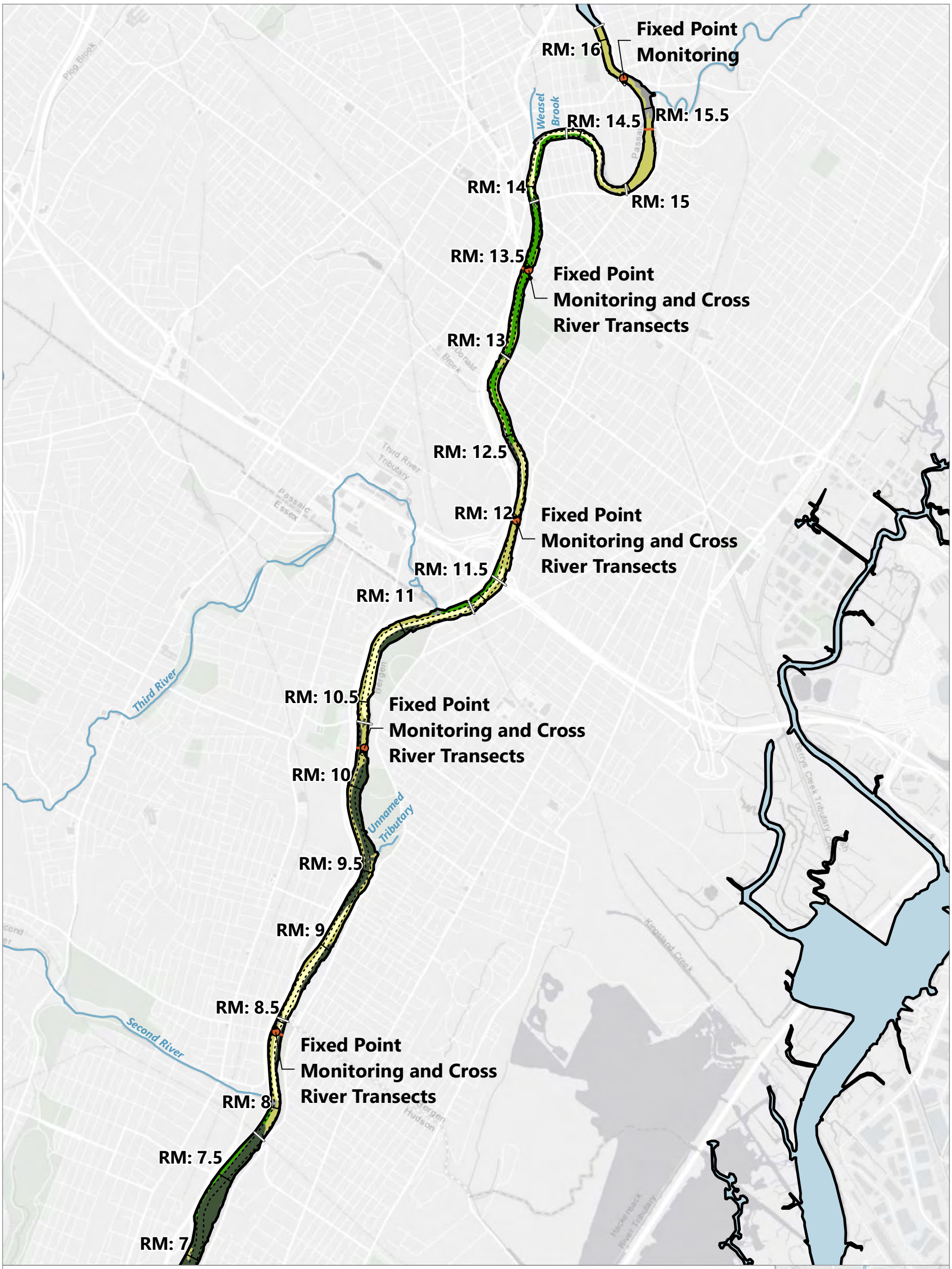

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Figure 1
Current Conditions Monitoring Locations
Field Sampling Plan Addendum
Current Conditions Monitoring Program - Physical Water Column Monitoring
Lower Passaic River Restoration Project

Attachment 1

Photographs of Field Activities

Photograph 1: AECOM labeling sample containers to be used for surface water sampling.

09/19/2019

Photograph 2: OSI performing a vertical profile off the side of the boat with the GPS head directly over sample location.

09/19/2019

Photograph 3: OSI performing a vertical profile while the AECOM crew prepares the sample containers.

09/19/2019

Photograph 4: AECOM filling sample containers using the peristaltic pump.

09/19/2019

Photograph 5: AECOM labeling sample containers before collection while OSI performs a vertical profile.

09/20/2019

Photograph 6: AECOM purging water using the peristaltic pump before the collection of samples begins.

09/20/2019

Photograph 7: OSI performing a vertical profile with the YSI before the collection of samples.

09/20/2019

Attachment 2

Field Logbook

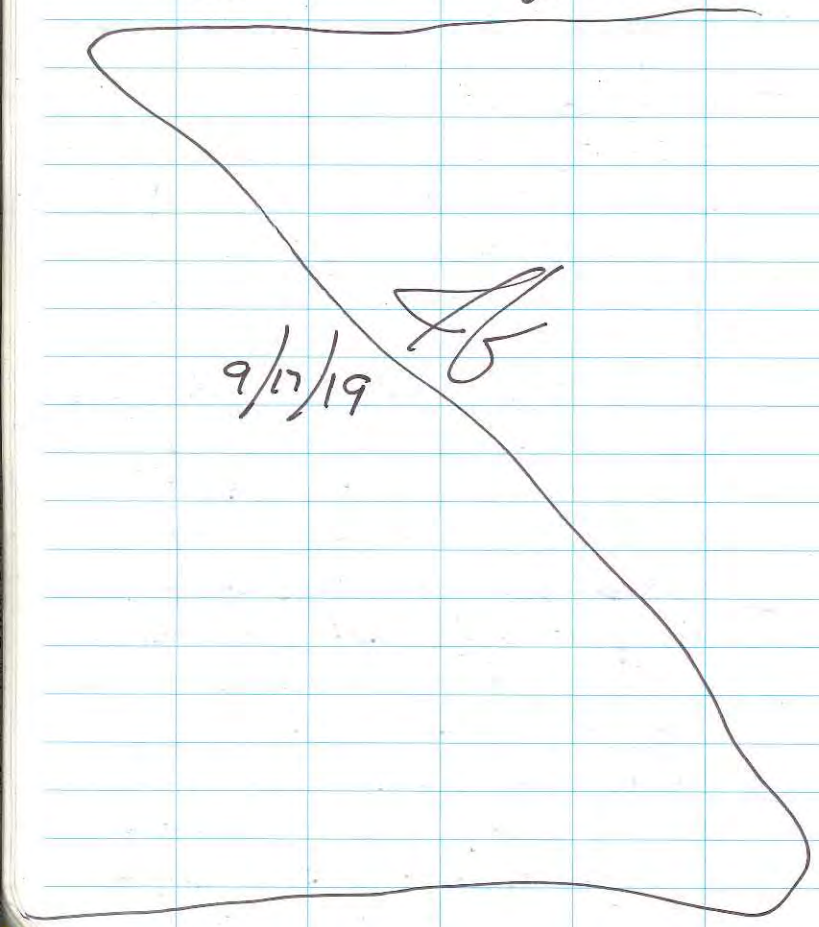
Location Rutherford NJ Date 9/17/19

Project / Client LPR / USACE

Diamond alkali OU4 / EWCM

1700 AECOM crew offsite. TG finishing up packing coolers.

1745 TG drops two coolers to Katahdin + two coolers to AXYS. @ FedEx. Offsite



Location Rutherford NJ Date 9/18/19

Project / Client LPR / USACE

Diamond alkali OU4 / PWCM

0530 TG arrives onsite

Weather: 65°F, partly cloudy

PPE: Level D, PFD

Purpose: Oversight of PWCM sampling

0600 Meet on dock with Alex, James, Chris, Mike, and Clare. H+S meeting delivered. Will head downstream to find the salt front.

0620 Depart from dock downstream

0720 Salinity of 2.2ppt found right by channel buoy 12, south of RR bridge. Heading 1.5 miles upstream to check salinity

0740 Preparing tubing and YSI. Getting ready to sample first location. Vertical profile completed.

0745 Samples collected from top + bottom @ 1.5 miles upstream from 2.2ppt salt front, flood tide.

0755 Vertical profile taken @ 0.25 miles downstream from first sampling location.

9/18/19

Location Rutherford NJ Date 9/18/19

Project / Client LPR / USACE

Diamond Alkali 044 / PWCM

0758 Samples collected from this location, top + bottom

0803 Electrofishing boat with WindWard crew drives by. OSI boat reaches next sampling location, 0.25 mi from previous sample location. Vertical profile performed WindWard boat passes us a 2nd time, moving opposite way.

0810 Begin collecting samples from this location.

0825 Arrive 0.25 mi downstream from last sample. Vertical profile taken.

0830 Samples collected from top and bottom at this location

0840 Arrive 0.25 mi downstream from last location. About 100 ft. from RR bridge, upstream. Vertical profile taken. 2.2 salt front is here.

0845 Samples collected from top and bottom at this location.

0853 Arrive 0.25 mi downstream from last point. Vertical profile taken.

0857 Samples collected from top + bottom at location. —— 9/18/19

Location Rutherford NJ Date 9/18/19

Project / Client LPR / USACE

Diamond Alkali 044 / PWCM

0903 Arrive 0.25 mi downstream. Back @ original 2.2 ppt salt front, near channel marker buoy 12. Vertical profile taken.

0907 Samples collected from top and bottom at this location.

0915 Arrive at 0.25 mi downstream from 2.2 ppt salt front. Vertical profile taken. Samples collected from top and bottom.

0930 Arrive 0.25 mi downstream from previous location. Vertical profile taken. Samples collected from top and bottom. Location is adjacent to lot with parked construction vehicles.

0945 Arrive 0.25 mi downstream, adjacent to the ULTA/Marshall's building. Vertical profile taken. Samples collected from top + bottom.

0955 Arrive 0.25 mi downstream, adjacent to storage King USA on west bank. Vertical profile taken. Samples collected from top and bottom. —— 9/18/19

Location Rutherford NJ Date 9/18/19

Project / Client LPR / USACE

Diamond Alkali 044 / PWCM

10[10] Arrive 0.25mi downstream. Under large open draw bridge. Vertical profile completed. Samples collected from top and bottom.

10[25] Arrive 0.25 mi downstream, just before traffic bridge. Vertical profile taken. Samples collected from top and bottom. Last sample to be taken during flood tide. 1 mile upstream of 2.2ppt point (5 samples), and 2 miles downstream (8 samples) collected.

11[00] Crew swaps coolers on shore in Harrison, NJ, are not going back to 1 Madison St to save time. Coolers picked up by Rick (AECOM). Crew takes lunch.

12[30] Back on water. Both boats head to find 2.2ppt salt front

13[45] 2.2ppt salinity front found. Located about 500ft North of high power line crossing, near boat launch on East bank.

RG 9/18/19

Location Rutherford NJ Date 9/18/19

Project / Client LPR / USACE

Diamond Alkali 044 / PWCM

Head downstream, will sample moving upstream for ebb tide.

14[00] Will start 2 miles downstream of 2.2 ppt front. First sampling location is ~~near~~ 16 in between RR bridge and solar buoy, across from abandoned house on East bank. Vertical profile taken. Samples collected from top + bottom here.

14[10] Travel 0.25 mi upstream, ~500' North of RR bridge. Vertical profile taken. Samples collected from top and bottom.

14[30] Travel 0.25mi upstream. Near Exit 6 sign on RTE 21. Vertical profile taken. Samples collected from top and bottom.

14[45] Travel 0.25 mi upstream. 100 ft upstream of RM 8.4 buoy. Vertical profile completed. Samples collected from top and bottom.

14[55] Travel 0.25 mi upstream. Adjacent to south border of football field on East bank. Vertical profile taken.

Location Rutherford NJ Date 9/18/19

Project / Client LPR / USACE

Diamond alkali OU4 / PWCM

15[15] Samples collected from top + bottom

Travel 0.25 mi upstream. Adjacent to Planet Fitness. Vertical profile taken. Samples collected from top and bottom.

15[25] Travel 0.25 mi upstream, ~100' upstream adjacent to Exit 5 sign on RTE 21. Vertical profile completed. Samples collected from top + bottom.

15[40] 0.25 mi upstream. ~100 ft downstream of debris collecting launch. Vertical profile taken. Samples collected from top + bottom

15[50] 0.25 mi upstream. Underneath high voltage power lines. Vertical profile taken. Samples collected from top and bottom. This is the original 2.2 ppt salt front.

16[05] 0.25 mi upstream. First samples to be collected north of salt front. Adjacent to crew boat launch dock. Vertical profile taken. Samples collected from top and bottom.

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Location Rutherford NJ Date 9/18/19

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Diamond alkali OU4 / PWCM

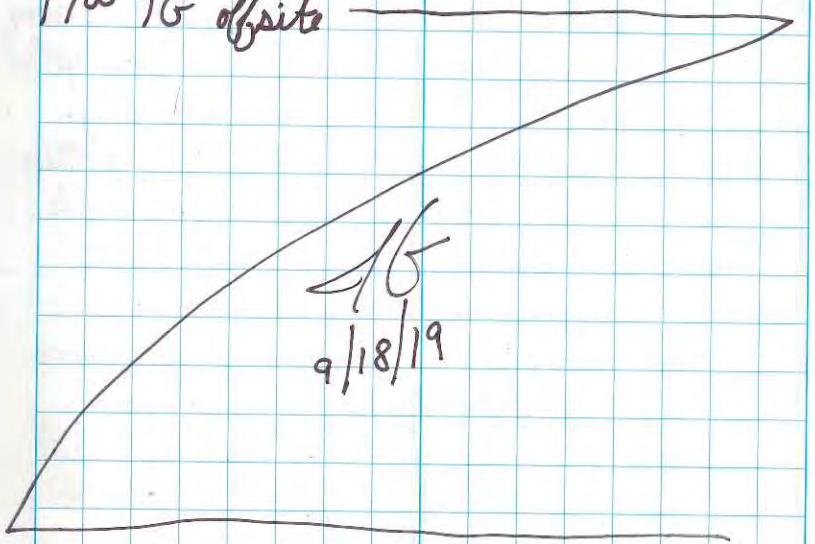
16[15] 0.25 mi upstream. Even with RM 10.2 buoy. Vertical profile taken. Samples collected from top and bottom

16[25] 0.25 mi upstream. ~150' north of De Jessa Bridge, adjacent to King's Court. Vertical profile taken. Samples collected from top and bottom.

16[40] 0.25 mi upstream. Vertical profile taken. Samples collected from top + bottom. Depart from location and head back to dock @ 1 Madison St.

17[05] Back @ dock.

17[30] TG offsite



Location Rutherford NJ Date 9/19/19

Project / Client LPR / USACE

Diamond Alkali 044 / PWCM

0615 TG onsite

Weather: 65°F, partly cloudy

PPE: Level D

Purpose: oversight of PWCM sampling and collection of CDM splits

0620 TG get coolers ready, and prepares for sampling events today

0700 H+S meeting on dock, Alex, James, Mike, Clare, Chris, + TG all present. CDM Smith will collect split samples from 5 locations, including MS/MSD and 1 duplicate.

0710 Depart dock and head downstream, RM 8.4 and 10.2 will be sampled today, blood tide in the morning.

0735 Arrive @ RM 8.4. OSI crew setting up YSI. AECOM setting up sample containers. OSI will boat over transect first to create line

0805 TG boards OSI boat to observe splits being taken. Vertical profile taken @ P1 @ RM 8.4

0815 Vertical profile (VP) taken @ P2, samples collected from top + bottom. CDM split taken from

Location Rutherford NJ Date 9/19/19

Project / Client LPR / USACE

Diamond alkali 044 / PWCM

bottom. [19E-CE02-T084-P2BS-CDM]

0827 VP @ P3 completed

0833 VP @ P4 completed. AECOM samples collected from bottom. WindWard boat drives by.

0835 Samples collected from top. CDM split [19E-CE02-T084-P4-AS-CDM]

0843 VP @ P5 completed.

0847 VP @ P6 completed. Samples collected from bottom. CDM split ID [19E-CE02-T084-P6-BS-CDM]

0850 Samples collected from the surface @ P6. AECOM also taken duplicate

0855 VP @ P7 completed. Crew mobilizes towards RM 10.2.

0920 Arrive @ RM 10.2. Scout transect. OSI drives across transect to map.

0931 VP @ P1 completed

0935 VP @ P2 completed. AECOM samples collected from bottom. CDM split ide [19E-CE02-T102-P2-BS-CDM]

0940 Samples collected from surface @ P2, RM 10.2.

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Location Rutherford NJ Date 9/19/19

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Diamond Alkali OU4 / PWCM

09⁴⁵ VP @ P3 completed

09⁴⁸ VP @ P4 completed. Samples collected from bottom.

09⁵⁰ Samples collected from top @ P4, COM split sample + duplicate taken. 19E-CE02-T102-P4-AS-COM + 19E-CE02-T102-P4-AS-COM-100 Parent sample has MS/MSD also. Both boats move to next location.

10⁰⁰ VP @ P5 completed

10⁰⁵ VP @ P6 completed. AECOM samples from top and bottom here.

10¹⁵ VP @ P7 completed. Both boats head back to 1 Madison dock.

10⁴⁰ Back @ dock. TG will buy ice + pack coolers for FedEx shipment, no more splits to be collected today.

12³⁰ TG drops 2 coolers off at FedEx for shipment to Katahdin. Break for lunch.

13⁰⁰ TG back onsite, awaiting ebb tide to continue PWCM sampling.

13³⁰ Back on dock, meeting with crew, heading out shortly.

TG 9/19/19

Location Rutherford NJ Date 9/19/19

Project / Client LPR / USACE

Diamond Alkali OU4 / PWCM

13⁴⁰ Depart dock, head downstream

14⁰⁰ Arrive at RM 10.2. OSI setting up ADCP and YSI. AECOM is labeling bottle-ware.

14²⁰ OSI boat heads to transect. Maps out entire transect before collecting samples.

14³⁰ VP @ P1, ebb tide completed

14³⁴ VP @ P2 completed. AECOM takes samples from top and bottom.

14⁴⁰ VP @ P3 completed

14⁴⁵ VP @ P4 completed. Samples collected from top and bottom.

14⁵³ VP @ P5 collected.

14⁵⁷ VP @ P6 collected. Samples taken from top and bottom

15⁰⁵ VP @ P7 completed. Both boats head to RM 8.4 for final transect.

15²⁰ Arrive @ RM 8.4. Mark out transect.

15³⁵ VP @ P1 completed.

15⁴⁰ VP @ P2 completed. AECOM takes samples from top and bottom.

15⁴⁷ VP @ P3 taken.

9/19/19

Rite in the Rain

Location Rutherford NJ Date 9/19/19

Project / Client LPR / USACE

Diamond Alkali OU4 / PWCM

15^{50} VP @ P4 taken. Samples collected from top and bottom.

16^{00} VP @ P5 completed

16^{05} VP @ P6 completed. Samples collected from top and bottom

16^{15} VP @ P7 completed. Both boats head back to 1 Madison dock.

16^{45} Back @ dock

17^{00} TG offsite

AG 9/19/19

Location Rutherford NJ Date 9/20/19

Project / Client LPR / USACE

Diamond Alkali OU4 / PWCM

7^{45} TG onsite

Weather: 75°F sunny

PPE: Level D

Purpose: Oversight of PWCM sampling

7^{50} Meet Alex, James, Mike, Clare, and Chris on dock. Preparing to depart dock and head to first location.

8^{05} Depart dock. Flood sampling begins

8^{15} Arrive @ RM 12.0. Set up equipment. OSI will mark out the transect before first sampling.

8^{45} VP @ P1 completed

8^{48} VP @ P2 completed. Samples collected from top and bottom.

8^{53} VP @ P3 completed

8^{57} VP @ P4 completed. Samples collected from top and bottom

9^{04} VP @ P5 completed

9^{07} VP @ P6 completed. Samples collected from this location, @ 2.2'

9^{13} VP @ P7 completed. Both boats head back to RM 13.5 for next samples.

AG 9/20/19

Location Rutherford NJ Date 9/20/19

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Diamond Alkali 044 / PWCM

930	Arrive at RM 13.5, OSI marks out transect to be sampled.
938	VP @ P1 completed
942	VP @ P2 completed. Samples collected from top and bottom
945	VP @ P3 completed
948	VP @ P4 completed, Samples collected from top and bottom.
955	VP @ P5 completed
958	VP @ P6 completed. Samples collected from top and bottom
1002	VP @ P7 completed. Both boats head back to dock to wait for ebb tide.
1400	TG back onsite.
1430	Board OSI boat. TG no longer on AQEA boat because Chris left. Will oversee from OSI boat.
1500	Arrive @ RM 12.0. Wait for sampling window.
1515	Mark out transect.
1522	VP @ P1 completed.
1528	VP @ P2 completed. Samples collected from top + bottom.

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Diamond Alkali 044 / PWCM

1531	VP @ P3 completed
1536	VP @ P4 completed. Samples collected from top and bottom. Duplicate taken from here, top
1545	VP @ P5 completed
1552	VP @ P6, completed. Samples collected from top + bottom
1559	VP @ P7 completed. Boat heads to RM 13.5 for final transect.
1615	Arrive @ RM 13.5. OSI marks out transect to be sampled
1630	VP @ P1 completed
1635	VP @ P2 completed. Samples collected from top + bottom
1639	VP @ P3 completed.
1645	VP @ P4 completed. Samples collected from top and bottom
1650	VP @ P5 completed
1655	VP @ P6 completed. Samples collected from top and bottom
1705	VP @ P7 completed, Boat heads back to 1 Madison dock.
1715	TG offsite

9/20/19

Attachment 3

Sample Tracking Log

PWCM #3

Cidra Groundwater Contamination Site
SAMPLE TRACKING LOG

Trace VOC LAB: _____ INORGANIC CLP LAB: _____

CLP CASE NO: _____ ORGANIC CLP LAB: _____ SUBCONTRACT LAB: Katahdin

SAMPLE ID	SAMPLE DATE	SAMPLE TIME	MATRIX	DEPTH (feet)	Trace VOC CLP NO.	ORGANIC CLP NO.	INORGANIC CLP NO.	SUBCONTRACT ANALYSIS	QA/QC
19E-CE02-T084 -P2-BS-CDM	9/19/19	815	SW	B	–	–	–	SSC, POC/DOC	
19E-CE02-T084 -P4-AS-CDM	↓	835	↓	A	–	–	–	↓	
19E-CE02-T084 -P6-BS-CDM	↓	847	↓	B	–	–	–	↓	
19E-CE02-T102 -P2-BS-CDM	↓	935	↓	B	–	–	–	↓	
19E-CE02-T102 -P4-AS-CDM	↓	950	↓	A	–	–	–	↓	MS/MSD
19E-CE02-T102 -P4-AS-CDM-100	↓	950	↓	A	–	–	–	↓	Duplicate

ANALYSIS SUMMARY: SSC- suspended solid concentration, POC/DOC- particulate organic carbon/ dissolved organic carbon